

Spinal cord motor function

What are the characteristic of different types of movement?

Voluntary movement : we can control it ,complex actions, have a goal and can be improve by learning

Reflex (involuntary movements): rapid, change its strength according to the stimulus

Rhythmic movement : combination of both types of movements , its initiation and termination are voluntary but the rest of it is reflexive

What are the main functions of the somatic motor system?

Cause movements ,make the body in a position suitable for movement , allow the movement to be smooth and balanced

What parts of motor system participate in planning for movement ,execute the movement ?

Planning for movement :basal ganglion , cerebellum , area 6 of the motor cortex , and thalamus .

Execute the movement : primary motor cortex , brain stem , spinal cord

What is the common final pathway of the motor

system ? what is the input and output of it?

The final pathway is the anterior motor neurons of the spinal cord because their action is directly on the muscles

Input is signals from higher brain center to spinal cord , out put signals from spinal cord to muscles

What are the functions of the following ?

Alpha motor neuron : controlling muscle contraction because it suppleies the muscle bulk (extrafusal fibers)

Gama motor neuron : controlling muscle tone due to its supplement to muscle spindle (intra fusal fibers)

Interneuron :responsible for the integration in the spinal cord , increase or decrease signal ,repeat it … by making different circuits : diverging circuit , converging circuit , lateral inhibition , repetitive circuit

Renshow cells : inhibition of certain motor neurons to focus signals by other motor neurons

What are the major functions of muscle spindle ,golgi tendon organs ?

Muscle spindle gives information about muscle length (tonic) and the changes in the length of it during contraction or relaxation

Golgi tendon gives information about the tension of the muscle and the change in it

Compare the static and dynamic response of the spindle ?

Static response : done by primary and secondary ending ,their rate of discharge is related to the degree of stretch , continue to discharge after the stretch had end

Dynamic response : only primary endings responde , the rate of discharge increase during the time of stretch, stop discharging when the stretch ends

Explain the steps of muscle stretch reflex?

When muscle stretch occurs meaning changing its length muscle spindle stimulated and send signals by afferent fibers to spinal cord where they synapse with alpha and gama neurons , alpha neuron stimulate muscle contraction to oppose the stretch (dynamic response), this is followed by static response to hold muscle in its length till there is a new change

What is the importance of gamma motor neuron?

When alpha neuron is stimulated gamma neuron is also stimulated (co activation) in order to keep the length of the spindle to continue send signals during muscle contraction

What is the importance of muscle stretch reflex?

For muscle tone , production of heat as result of muscle tone , make the contraction suitable to the load

Golgi tendon organ reflex

Why it is called inverse stretch reflex ?

Because this reflex occur as a result of over stretch (contraction of the muscle) in order to relax the muscle so it acts opposite to stretch reflex

How many synapse needed?

Two synapses because it is di- synaptic

Why it is consider as protective reflex ?

Because it prevents muscle damage

Explain the mechanism?

Over contraction of the muscle causes increasing in tension which stimulate the golgi tendon to send signals to relax the muscle

For the following reflxes , flexor , withdrawal, cross extensor mention the following ?

Type of reflex ?

All of them are polysynaptic reflexes

Witch part of the body involve in each one ?

Flexor reflex : flexor muscle of limbs

Withdrawal reflex : may involve other part of the body

Extensor reflex: extensor muscle of the opposite limb

Which circuits involved?

All of them : lateral inhibition , diverging , repetitive

In the spinal animal How can the postural and locomotion reflexes occur although the spinal cord is transected?

Reflexes occurs because of the Presence of neural circuit so no need for the higher brain center

Why these reflexes are incoordinated ?

Because of the absence of the higher brain center which is responsiple for coordination of the movement

In stepping and walking movement

What are the circuit involved and where they are located in the cord ?

Locomotion generator circuits located in cervical and lumber regions of spinal cord

The circuits based on two interneuron circuits what they are ?

Repetitive and lateral inhibition

Following spinal shock ?

Why all reflexes disappear at the beginning ?

Because all signals from higher brain centers that control the spinal cord are cut

Why the reflexes appear after a few days?

Because the spinal neurons regain their excitibilty

What is the first reflex to reappear ?

Simplest reflexes start then the more complex one

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